DETECTION OF DENTAL HYPOPLASIA – ABILITY OF FLUORESCENCE METHODS

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Summary. Third molars are a challenge because of the large varieties of crowns and roots, difficulties in the access, differences in the level of mineralization and root development. The aim of this study was to test the ability of quantitative laser fluorescence (QLF) method and light-induced fluorescence (LIF) method to detect dental hypoplasia of third molars. Forty-nine third molars from the same geographical and practice area were diagnosed for fissure caries: clinically – by ICDAS II, and paraclinically – by QLF method, using as a tool DIAGNOdent Classic and LIF method – applied with SoproLife diagnostic lamp. Eleven third molars with non-completed root development were separated in a group and examined using the same methods. Four of them with almost the same development of the roots were examined by X-ray. Different clinical manifestations of hypoplasia were observed. The diagnosed defects were: enamel hypoplasia, idiopathic white spots, hypomineralization of enamel – "etched enamel". For dental hypoplasia the LIF method served as an intraoral camera with magnification – x 30 – x 100 times. DIAGNOdent incorrectly measured mineral loss as a carious lesion with different depth. In conclusion, only best clinical knowledge and experience can diagnose properly hypoplastic teeth. Magnification of intraoral cameras like SoproLife can facilitate clinical decision making.

Key words: *dental hypoplasia, third molars, dental caries*

INTRODUCTION

Dental hypoplasia occurs as a consequence of malnutrition, poor nutrition, or as a manifestation of systemic diseases [1, 6]. Third molars are the most frequently affected teeth by hypoplasia. On the other hand, third molars are often important for prosthetic dentistry. They are a challenge due to the large varieties of crowns, roots, difficulties in the access, differences in the level of mineralization and root development, and the presence of non-caries diseases

[2-4]. Often hypoplastic teeth don't require any operative treatment and can remain in the dental arch longer than carious teeth or endodonticaly treated teeth, without any interventions. Decision making depend on the type of hypoplasia and its clinical manifestation (Fig. 1).

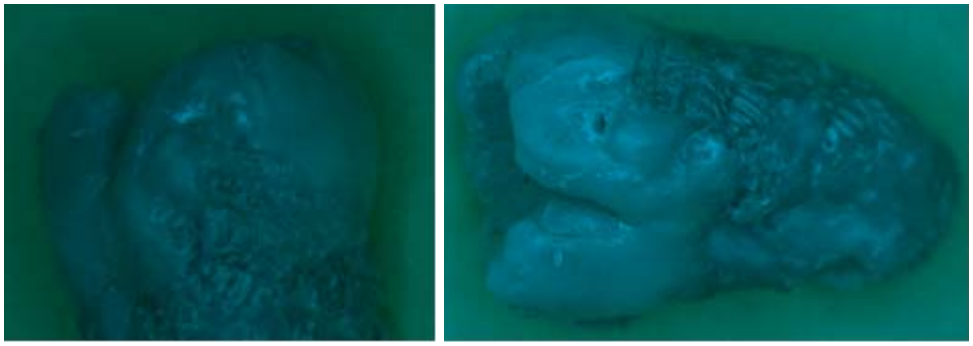


Fig. 1. (a, b) Dental hypoplasia on the crown of a human molar, extracted recently

AIM

The aim of the study was to test the ability of quantitative laser fluorescence (QLF) method and light-induced fluorescence (LIF) method to detect dental hypoplasia of third molars.

MATERIALS AND METHODS

Third molars n = 49 from the same geographical and practice area were diagnosed for fissure caries: clinically – by ICDAS II, and paraclinically – by QLF method, using DIAGNOdent Classic and LIF method applied with SoproLife diagnostic lamp. [7]. Eleven third molars were diagnosed with non-caries crown defects and with non-completed root development. LIF method was applied with SoproLife lamp to detect dental hypoplasia from normal structures in the following modes [7]: "Day light" with magnification x 30; "Macro image" with magnification up to 100 times; "Blue light" with length 450 nm.

Four of the teeth with almost the same development of the roots were examined by X-ray.

RESULTS

Different clinical manifestations of dental hypoplasia were observed. Five of the teeth with non-completed root development were diagnosed with enamel hypomineralisation. One tooth was found with fluorosis 1st stage. LIF method – diagnostic lamp SoproLife did not make difference between dental hypoplasia and normal structures. Fluorescence color of hypoplasia was the same as the fluorescence color of sound tissues – green.

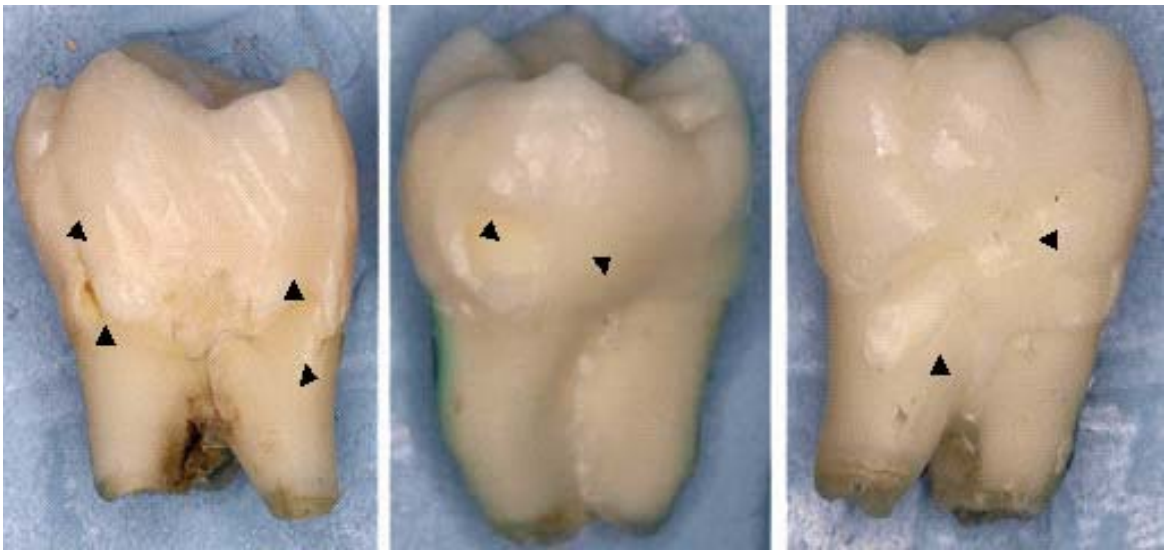


Fig. 2. (a-c) Different appearance of enamel hypoplasia in third molars with non-completed root development

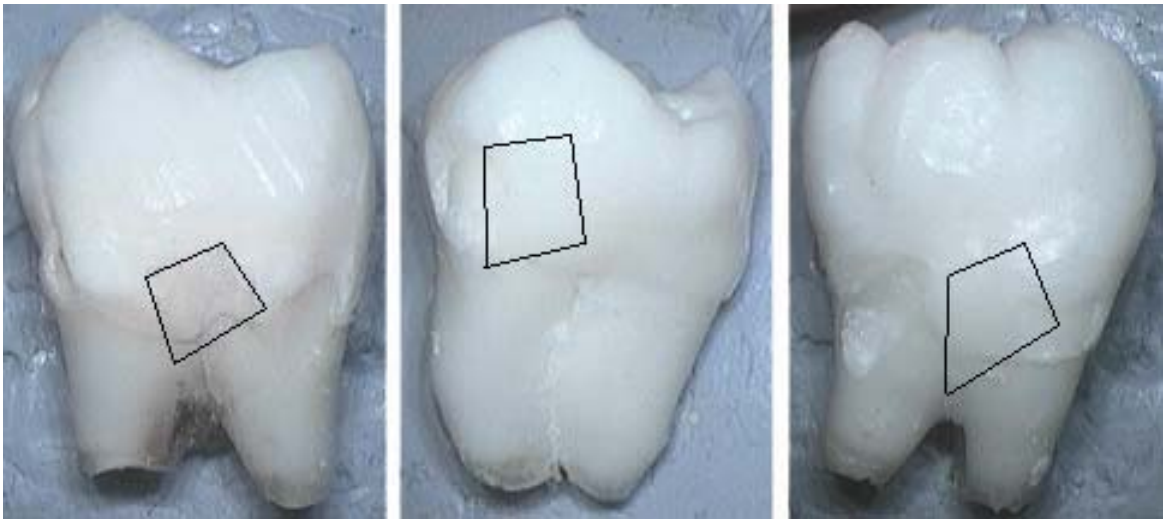


Fig. 3. (a-c) Diagnosis with LIF method – SoproLife lamp. “Day light” mode

DIAGNOdent diagnosed hypoplasia as caries dependent on the depth of the defect, i.e. scores 11-20 when the hypoplasia affects the outer half of the enamel (2 teeth, scores: 15-18), 20-30 – when the hypoplasia affects the inner half of the enamel (1 tooth, scores: 22-27); +30 for dentin caries (1 tooth, scores: 41-44).

The diagnosed defects were: enamel hypoplasia, idiopathic white spots, hypomineralisation of enamel – “etched enamel”. Only 3 of 11 teeth were sound. Different mineralization stages of the crowns of the teeth were diagnosed with almost the same degree of root development.

DISCUSSION

Often hypoplastic teeth are diagnosed properly after extraction. Poor diagnosis of dental hypoplasia in Bulgaria is due to several reasons [5]. One is the very rare

occurrence of the disease in the past. Recently hypoplastic teeth have become more common, particularly in some ethnic groups, most often among third molars. Often these teeth are reliable even for bridges. They don't need any treatment when the appearance of the disease is like the one shown in Fig. 1. Non-operative treatment can be performed in cases shown in figures 2 a and 2 c. Simple abrasive technique and coverage with resin materials can be applied in cases like the one shown in Fig. 2 b. The poor sensitivity of fluorescence methods to distinguish between hypoplasia and dental caries or non-caries enamel defects (dental erosions, attrition, etc.) leads to wrong operative treatment plans and possible multiple iatrogenic errors.

CONCLUSIONS

1. DIAGNO dent detects mineral losses of hypoplastic teeth as carious lesions with different depth.

2. LIF method with SoproLife "blue light" mode does not differentiate dental hypoplasia by the fluorescence color.

3. For dental hypoplasia, detection with LIF method serves as an intraoral camera with magnification – x 30-100.

4. Only best clinical knowledge and experience can diagnose properly hypoplastic teeth. Magnification of intraoral cameras like SoproLife can facilitate clinical decision making.

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